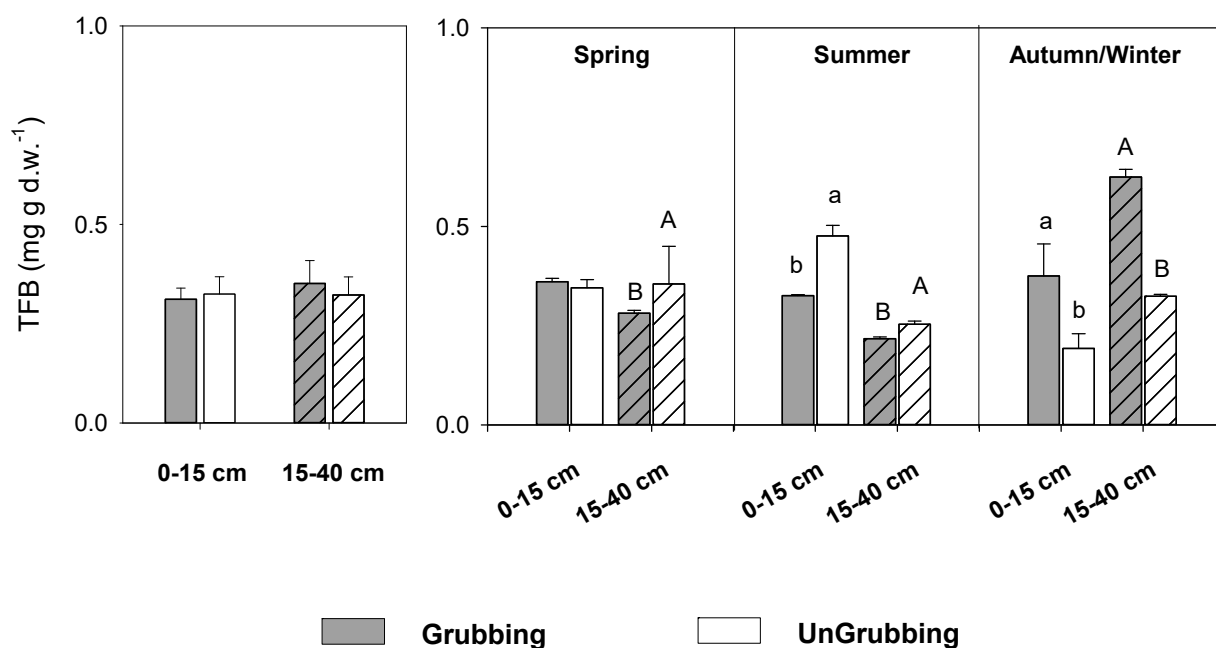
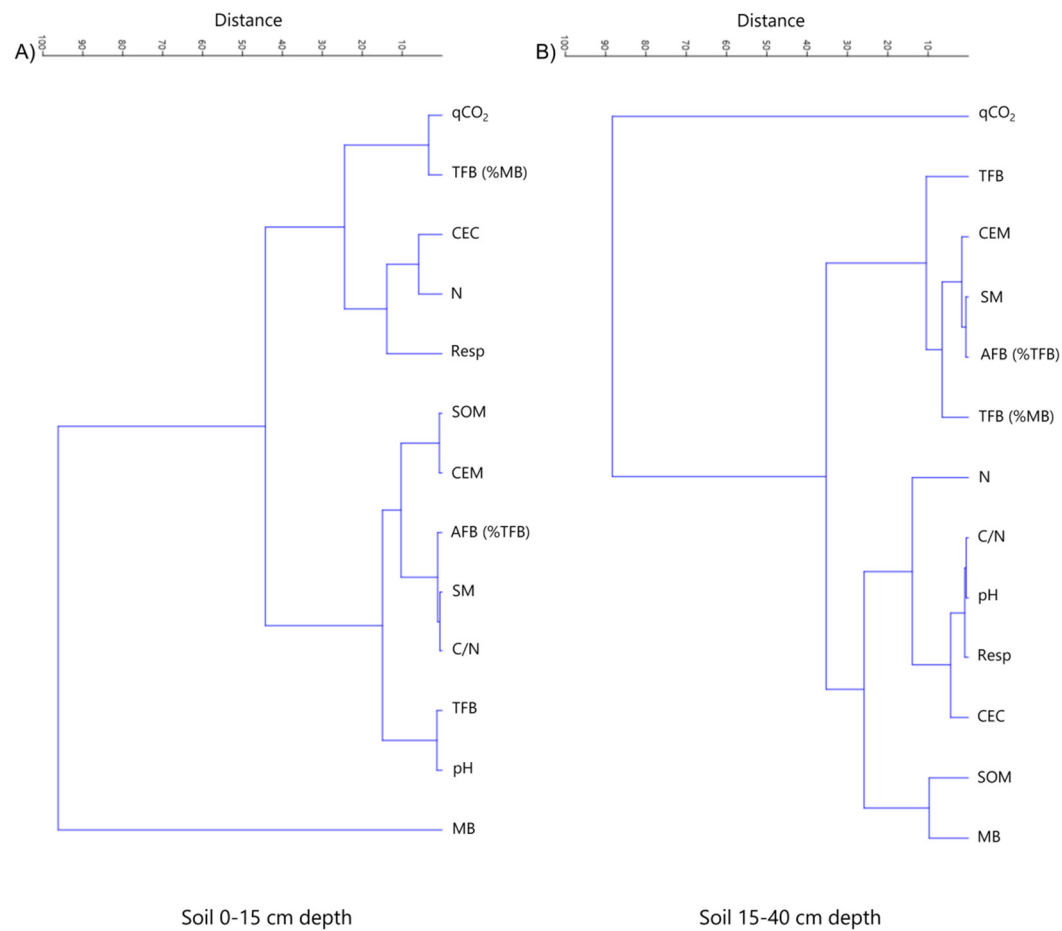


Supplementary material Figure S1. Soil moisture (SM, % d.w.) and pH in grubbed (G) and ungrubbed (UG) soils at 0-15 and 15-40 cm depth. On the left, the annual means are reported; on the right, data for each season (Spring, Summer, and Autumn/Winter) were showed. Different lowercase letters indicate significant differences in superficial layer, whereas uppercase letters show significant difference in deeper layer for at least $P < 0.05$ (paired t-test for annual means and Three-way ANOVA for seasonal means, respectively).



Supplementary material Figure S2. Total Fungal Biomass (TFB, mg g d.w.⁻¹) in grubbed (G) and ungrubbed (UG) soils at 0-15 and 15-40 cm depth. On the left, the annual means are reported; on the right, data for each season (Spring, Summer, and Autumn/Winner) are showed. Different lowercase letters indicate significant differences in superficial layer, whereas uppercase letters show significant difference in deeper layer for at least P < 0.05 (paired t-test for annual means and Three-way ANOVA for seasonal means, respectively).



Supplementary material Figure S3. Cluster analyses (UPGMA) summarizing the different impact of wild boar grubbing (IF_G) on soil parameters at 0-15 (A) and 15-40 cm (B).

Supplementary material Table S1. Coefficients of Spearman rank order correlation performed between biological (MB: microbial biomass, AFB (%TFB): percentage of active on total fungal biomass, TFB: total fungal biomass, TFB(%MB): percentage of fungal on total microbial biomass, Respiration, qCO₂: metabolic quotient, CEM: coefficient of endogenous mineralization) and physical and chemical parameters (pH, SM: soil moisture, SOM: soil organic matter, Ns: soil nitrogen, soil C/Ns ratio, CEC: cation exchange capability, WHC: water holding capacity, BD: bulk density) in grubbed (G) and ungrubbed (UG) soils sampled at 0-15 and 15-40 cm depth. The correlations between the biological parameters and WHC and BD are reported only for the superficial layer. In bold statistically significant coefficients for P < 0.05 (*), P < 0.01 (**) and P < 0.001 (***) are indicated.

		G							
		pH	SM	SOM	Ns	C/Ns	CEC	WHC	BD
MB	0-15 cm	0.263	0.573*	-0.538	-0.322	-0.007	0.218	-0.148	-0.148
	15-40 cm	-0.365	0.518	0.600*	-0.655*	0.209	0.109		
AFB(%TFB)	0-15 cm	-0.636*	-0.583*	0.700*	0.567	-0.350	0.109	-0.316	-0.316
	15-40 cm	0.046	0.378	0.503	-0.503	0.287	-0.546		
TFB	0-15 cm	0.754**	0.330	-0.382	-0.792***	0.473	0.218	0.030	0.030
	15-40 cm	0.077	0.189	0.727**	-0.371	0.406	0.109		
TFB(%MB)	0-15 cm	-0.030	-0.879***	0.042	0.018	0.103	-0.109	0.135	0.135
	15-40 cm	0.419	-0.587*	0.657*	0.657*	-0.259	0.218		
Respiration	0-15 cm	-0.487	-0.265	0.384	0.470	-0.384	0.436	0.131	0.131
	15-40 cm	0.405	-0.720**	0.238	0.566*	-0.587*	0.327		
qCO ₂	0-15 cm	-0.560	-0.382	0.527	0.618*	-0.500	0.218	0.048	0.048
	15-40 cm	0.286	-0.655*	-0.545	0.764**	-0.0182	-0.436		
CEM	0-15 cm	0.089	-0.323	-0.501	-0.191	0.150	0.327	0.261	0.261
	15-40 cm	-0.200	-0.385	-0.734**	0.483	-0.350	0.436		
		UG							
MB	0-15 cm	0.031	0.235	0.214	-0.245	-0.007	-0.327	0.563	0.563
	15-40 cm	0.059	0.748**	0.238	-0.378	-0.921***	-0.218		
AFB(%TFB)	0-15 cm	-0.127	0.673*	0.091	-0.427	0.200	0.218	-0.140	-0.140
	15-40 cm	0.260	0.260	0.273	0.371	0.024	-0.546		
TFB	0-15 cm	-0.126	-0.621*	-0.115	0.468	-0.425	0.327	-0.089	-0.089
	15-40 cm	-0.863***	-0.863***	-0.797***	-0.545	0.476	0.327		
TFB(%MB)	0-15 cm	-0.049	-0.455	-0.069	0.455	-0.280	0.218	-0.059	-0.059
	15-40 cm	-0.078	-0.734**	-0.231	0.371	0.911***	0.218		
Respiration	0-15 cm	0.636*	-0.413	-0.706**	0.371	0.503	-0.109	0.030	0.030
	15-40 cm	-0.311	-0.070	-0.594*	-0.266	0.452	0.000		
qCO ₂	0-15 cm	0.657*	-0.517	-0.769**	0.336	0.476	-0.109	-0.030	-0.030
	15-40 cm	0.020	-0.364	-0.322	0.189	0.687*	-0.436		
CEM	0-15 cm	0.702*	-0.519	-0.786***	0.214	0.575*	0.000	-0.089	-0.089
	15-40 cm	-0.338	-0.338	-0.727**	-0.378	0.294	0.436		

Supplementary material Table S2. Coefficients of Spearman rank order correlation performed between physical and chemical soil parameters (pH, CEC: cation exchange capability, SM: soil moisture, WHC: water holding capacity, BD: bulk density, SOM: soil organic matter, Ns: soil nitrogen, soil C/N_L ratio) including SQI and plants features (leaf traits: LA: leaf area, RWC: relative water content, N_L: leaf nitrogen leaf C/N_L ratio and fruit characteristics: P/S: pulp/stone ratio, DM: dry matter and Tp: total polyphenols). Soil, leaves and fruits were sampled in grubbed (G) and ungrubbed (UG) areas and soils sampled at 0-15 and 15-40 cm depth. The correlations between WHC and BD and plants features are reported only for the superficial layer. In bold statistically significant coefficients for P < 0.05 (*), P < 0.01 (**) and P < 0.001 (***) are indicated.

	G															
	pH		SM		SOM		N _s		C/N _s		CEC		WHC	BD	SQI	
	0-15 cm	15-40 cm	0-15 cm	15-40 cm	0-15 cm	15-40 cm	0-15 cm	15-40 cm	0-15 cm	15-40 cm	0-15 cm	15-40 cm	0-15 cm	0-15 cm	0-15 cm	15-40 cm
LA	0.007	-0.114	0.281	0.007	-0.029	-0.056	0.188	-0.084	-0.039	0.231	-0.873***	-0.828***	-0.207	-0.207	-0.441*	0.217
RWC	0.315	-0.346	0.251	-0.035	-0.439*	-0.301	-0.450*	0.210	0.220	-0.336	0.327	-0.312	-0.177	-0.177	-0.161	-0.308
N _L	-0.459*	-0.583**	-0.261	0.196	0.086	0.538**	0.199	-0.231	-0.540**	0.378	0.510*	0.475*	0.118	0.118	0.035	0.049
C/N _L	0.375	-0.105	0.066	-0.241	-0.093	-0.364	-0.350	0.371	0.419*	-0.140	0.020	0.020	0.207	0.207	-0.147	-0.308
P/S	0.072	0.051	0.353	-0.146	-0.057	0.087	-0.466*	-0.116	0.175	0.116	0.171	-0.171	0.851***	-0.153	0.087	0.235
DM	0.077	0.056	0.358	-0.151	0.562**	0.092	-0.471*	-0.121	0.184	0.134	0.176	-0.176	0.864***	-0.268	0.091	0.273
Tp	0.171	0.123	0.355	-0.148	-0.059	0.089	-0.568**	-0.100	0.177	0.118	0.213	-0.184	0.847***	-0.047	0.089	0.217
	UG															
LA	-0.294	-0.297	0.105	0.262	-0.538**	-0.266	0.188	-0.084	-0.044	-0.056	0.327	0.327	-0.207	-0.207	-0.601*	0.245
RWC	-0.566**	0.251	-0.236	-0.042	0.270	-0.315	-0.450*	0.210	-0.175	0.235	0.516*	0.499*	-0.266	-0.266	-0.119	-0.049
N _L	-0.522**	-0.510*	0.122	0.000	0.389	-0.301	0.199	-0.231	-0.542**	0.256	0.517*	0.451*	-0.384	-0.384	-0.035	0.112
C/N _L	0.308	0.160	-0.249	-0.007	-0.424*	0.273	-0.350	0.371	0.479*	-0.196	-0.109	-0.109	0.355	0.355	0.007	-0.007
P/S	0.235	-0.317	0.146	0.116	0.116	-0.087	-0.466*	-0.116	-0.057	-0.028	-0.171	-0.171	0.853***	-0.174	0.441*	0.146
DM	0.256	-0.345	0.199	0.222	0.525*	-0.098	-0.471*	-0.121	-0.079	-0.080	0.187	-0.187	0.868***	-0.222	0.443*	0.148
Tp	0.237	0.053	0.148	0.118	0.118	-0.089	-0.568**	-0.100	-0.099	-0.035	0.173	-0.173	0.855***	-0.301	0.449*	0.100